

failures have preceded the attainment of the 26-in. diameter, and Chance and Co. are said to be the only firm in the world who will undertake the manufacture of a disc of that size. Science knows no country, and Mr. Lick's munificent bequest in the cause of astronomy will be hailed by *savans* all over the world.

MENTAL POTENTIALITY IN CHILDREN OF DIFFERENT RACES

MONS. J. C. HOUZEAU, the author of the "Études sur les facultés mentales des animaux comparées à celles de l'homme," has lately concluded, in Jamaica, a series of laborious experimental investigations on the relative or comparative intellectual capacity and development of the children of different races inhabiting that island. The conclusions arrived at by such an observer are worthy of the highest consideration in Europe: while the subject is one that has an important bearing on various popular educational, ethnological, and social questions of the day—such as the unity of mankind, and the possibility or probability of civilising savage races. A recent letter addressed to me by M. Houzeau, contains the following brief account of his experiments and conclusions; an account that cannot fail, I think, to be interesting to the readers of NATURE.

"I have been busy, meanwhile, on a curious study about the comparative development of intelligence of children belonging to different races. I had an opportunity here to submit to the test black, brown, and white children. Fifteen of them were sent to me every day for two hours by their parents, my country neighbours: three of them white, seven coloured of various shades, and five black. For a whole year I gave them myself common instruction, and carefully watched their proceedings and their rate of improvement. I do not expect to publish anything about that experiment, at least at this time. But I will state here the conclusions to which it has led me.

"1. There is in each child a different degree of intellectual proficiency, which could be called, in mathematical language, his or her 'personal coefficient.' However, these individual differences are much less than I had anticipated, and are not the striking feature in the unequal rate or speed of improvement.

"2. In this unequal speed, I see nothing—at least nothing clearly and unmistakably discernible—that can be referred to the differences of race. This will probably appear strange after all that has been said of 'inferior races.' Should other facts show that my experiment was not properly conducted, and that the trial was not conclusive, I am ready to give up. Still, it is at least my 'provisional conclusion.'

"3. The rate of improvement is due almost entirely to the relative elevation of the parental circle in which children live—the home influence. Those whose parents are restricted to the narrowest gauge of intellectual exercise, live in such a material and coarse *milieu*, that their mental faculties remain slumbering and gradually become atrophied; while those who hear at home of many things, and are brought up to intellectual life, show a corresponding proficiency in their learning.

"The question of course would require more space and development. I rather mention it as a subject for study than anything else. I had in my life some rare opportunities to study 'inferior races,' including Indians of America, and 'half-breed Indians' of the mixed race of Mexico. I believe most of the *savans* of Europe have but a very incomplete idea of the mental, and still more of the moral, status of 'inferior societies.' Much remains to be said about it."

My present object being briefly to introduce to English readers M. Houzeau's views as to the relative intellectuality of the children of different races in Jamaica, I will

not here explain in what respects I differ from his conclusions—how far I regard his experiments inconclusive. I would only remind him, as well as the reader, of the impossibility of duly estimating the direction or amount of future or adult mental development by the study of mental phenomena in the young. It has been, I think, proved, for instance, that—

1. At or up to a certain age girls are as sharp as, or sharper than, boys at lesson-learning and repeating. Cases are constantly being recorded—perhaps paraded—in the newspapers of girls or young women beating boys or young men of equal age in competitive examinations. And yet it is not to be inferred that the female mind is either superior or equal to the male, that is, in a comparison of averages. For the fact is, that throughout the animal series, including Man, the female mind is, in some respects, different from, and inferior to, that of the male. We know, moreover, that female superiority, when it exists, is usually at least confined to school life. In subsequent intellectual development proper, man, as a rule, far surpasses woman. Again—

2. Up to a certain point there is the closest possible parallelism between the mental endowments of the human child and of the young of sundry other animals. At certain stages of development, and in certain animals, the comparison is not even in favour of the child. And yet, though we are still far from knowing what is the range of the mental potentialities of other animals than man, we have no reason for supposing that in any of them will the maximum intellectual or moral development attain to the average in cultured and civilised man.

W. LAUDER LINDSAY

NOTES

At a recent meeting of the Trustees of the "Gilchrist Educational Trust," they decided to appropriate a sum not exceeding 1,000*l.* to the promotion of scientific research, with the prospect of repeating this grant annually if it should bear adequate fruit. The plan proposed is to ask the Council of the Royal Society to make recommendations to the Trustees, stating in each case the object of the research, the qualifications of the individual by whom it is to be conducted, and the sum they propose to be assigned to him; the purpose of the grant being to assist men of science who have shown themselves capable of advancing science, and who may feel themselves precluded from devoting their time to *unremunerated* work, by freeing them from the necessity of giving up investigations of great promise for the sake of mere bread-earning. We believe that this important movement is due to the representations of Dr. Carpenter, the Secretary, to the Trustees, that they would be in this mode worthily applying about a fourth part of their income in meeting a great national want, and in promoting the second of the objects as to which they have an uncontrolled discretion under the will of the founder—"The benefit, *advancement*, and propagation of learning in every part of the world." The Council of the Royal Society has, we understand, appointed a Committee to consider the conditions under which the Council may most fittingly undertake the responsibility of advising the Gilchrist Trustees as to the appropriation of their grants.

THE matter in dispute between the President and Council of the Linnean Society and a certain section of the Fellows, which caused so much excitement in the Society some months ago, and led to the premature retirement of Mr. Bentham from the chair, was referred to Lord Hatherley as arbitrator, and has just been decided entirely in favour of the President and Council; so that no further action will be taken in the matter.

WE regret to record the death, on July 31, of Dr. Charles T. Beke, whose name is so well known in connection with geography, ethnology, and philology.

WE have reason to believe that it is the intention of Dr. J. E. Gray to send in his resignation of the Curatorship of the Zoological Department of the British Museum at the close of the present year. Such being the case, he would retire from office towards the middle of 1875, within six months of his resignation being accepted.

AN interesting experiment was recently made by MM. Bertrand and Mortillet, directors of the St. Germain Museum, in the Champ de Manœuvre: the war implements constructed from designs of Trajan's Column were tested, when it was found that the catapult threw arrows a distance of 300 yards. The mark was hit regularly each time up to 180 yards. The same can be said of the *onager*, which sends stones to a distance of 180 yards with astonishing precision, although weighing 1½ lbs. The initial velocity was calculated to be more than fifty metres per second, as the time taken to reach the mark is not more than seven seconds and sometimes less than five. All these apparatus are to be tried at a public exhibition to be given in the beginning of next October.

ON Saturday last, the "capping day" of the graduates of Edinburgh, the occasion was celebrated by the customary dinner of the Edinburgh University Club, at St. James's Hall; Dr. Cobbold, F.R.S., in the chair. Amongst the distinguished visitors present was the Right Hon. Sir Bartle Frere, K.C.B., who, on replying to the toast of "The Visitors," remarked on the high state of efficiency of the men who entered on Foreign Service, having previously studied at the northern University. During the afternoon a telegram was received from Prof. Balfour announcing that upwards of 100 new graduates were enrolled amongst the alumni of the University.

AT the last meeting of the Connecticut Academy of Arts and Sciences, Prof. Marsh made a communication on the size of brains of tertiary mammals, comparing the relative sizes of those of the Eocene, Miocene, and Pliocene. His facts appear to have a very important bearing on the history of the evolution of mammals, and indicate future interesting lines of research. In all the known examples of groups he has been able to compare, he finds those of the Eocene have remarkably small brains; those of the Miocene are larger, and the Pliocene still larger, while the existing species are again still larger.

DR. G. B. HALFORD writes to the *Melbourne Argus* on the strength of the poison of Australian snakes as compared with those of India, and also of the efficacy of liquor ammoniac in counteracting the poison. It is established that the poison of the Australian tiger snake is as deadly as that of the cobra, but Dr. Ewart of Calcutta concludes from experiments that the liquor ammoniac as a counter-agent is inert. Dr. Halford gives the details of a case in which a greyhound which had been so badly bitten by a snake as to be totally "insensible either to sound or feeling, and never moved," was rapidly brought to life and strength by the injection of ammonia and water into the jugular vein. Dr. Halford thus concludes his letter:—"They have far more advantages in India for these inquiries than we have at present. They have their snake men, who handle the reptiles freely for them—a Government that has already given thousands of pounds for the purpose of experiment and publication. I feel myself a very poor and insignificant rival, and yet there is nothing I should like better than to pursue the subject to the end, if that be possible—not to publish an illustrated work on snakes, with details of all the failures in treatment that have ever occurred, but to discover the best remedy or remedies for the treatment of snake-poisoning. If the Government would assist, I would do the work; or if they would appoint anyone else I would help with every suggestion possible, for in the long interval that has elapsed since my first experiments I have not been idle.

It is good in science, as in other things, occasionally to *reculer pour mieux sauter*."

IT is said on good authority that the introduction of sheep into the foot hills and higher portions of the Sierra Nevada, in California, is beginning to make havoc of its proper flora.

A MATHEMATICAL Society of Bohemia, with its headquarters at Prague, has announced its formation.

THE last meeting for the year of the American Academy of Science and Arts was held in May, yet early in June the volume of Proceedings was issued, containing all the papers of the session.

PROF. SILVESTRI, who has made a special study of the phenomena of Mount Etna, announces that an eruption may be expected shortly.

THE Hope Chemistry Prize in the University of Edinburgh, now converted into a travelling scholarship, has been awarded to Mr. R. M. Robertson.

A TELEGRAM from Melbourne, of Aug. 1, states that Coggia's comet is visible there and presents a brilliant appearance.

M. SIDOROFF, says the *Eastern Budget*, member of the Geographical Society of St. Petersburg, has addressed a report to the Russian Admiralty with regard to the Austrian Polar Expedition, of which nothing has been heard since August 1872. M. Sidoroff says in his report that the *Trgetthoff* was last seen by Count Wiltczek in a gulf near Cape Nassau, whose outlet was then being choked up with ice. Since that time various seamen coming from Novaya Zemlya have reported that the quantity of drift ice in the Icy Sea had considerably increased, and that in the summer of 1873 it was extraordinarily abundant. Formerly the ice on the coast of the above island only extended to a distance of five versts in the month of June, while in mid-summer 1873 the width of the icy zone amounted to about 100 versts. M. Sidoroff believes that if Cape Nassau had been free of ice, the *Trgetthoff* would certainly have gone round the north-eastern point of Novaya Zemlya, which is only a day's journey from Cape Nassau, and thus reached the gulf of Yeniseisk without difficulty. It is therefore probable that the expedition is frozen up and in want of provisions, and M. Sidoroff accordingly recommends the Russian Government to send food, &c., by land to Cape Nassau, adding that he will contribute 100*l.* to the expenses of the undertaking. The Admiralty has approved of this proposal, and is now taking the necessary steps for carrying it out.

WITH regard to the question of "Sounding and Sensitive Flames," Mr. A. K. Irvine, of Glasgow, writes—"About twelve years ago I first observed the 'sounding' flame as it occurs on the combustion of gas and air passing through a disc of wire gauze enclosed in a tube, and showed it to one or two scientific friends, but I published nothing on the subject till 1871, when I took patents in this and other countries for a miners' safety lamp, which indicates by a loud musical note the presence of an explosive atmosphere, by the ignition (at the ordinary flame of the lamp) and combustion of the gas and air entering through a disc of wire-gauze surrounding the wick tube."

THE annual session of the British Archaeological Association commenced on Tuesday morning in Bristol, under the presidency of Mr. Kirkman Hodgson, M.P., and will continue all the week and conclude next Monday at noon. The members of the Association, numbering about 100, and including archaeologists from all parts of the country, assembled in the Guildhall, where they were welcomed by the Mayor and Corporation. The party then proceeded to the first point of interest on the day's programme, namely, St. Mary Redcliffe Church; here Mr. F.

Godard, F.S.A., read a short paper on the church. The members of the Association afterwards visited the Temple Church, which is noted for the fact of its tower being 4 ft. out of the perpendicular.

THE great work "On the Marine Mammals of the North Pacific," by Capt. C. M. Scammon, of the United States Revenue Service, has now been completed and is published by John H. Carmany & Co., San Francisco. It forms a stout quarto volume, with many plates, and contains an exhaustive history of the whales, porpoises, and other Cetaceans, together with that of the sea-elephant, sea-lion, sea-otter, the walrus, &c., all accurately figured and described. A specially important section of the volume is that upon the American whale-fishery, giving an account of its origin, extent, mode of prosecution, its progress and present condition, with a full description of all the apparatus used in the capture and utilisation of the Cetaceans, and the incidents of a whaling life. In an appendix is a systematic account and catalogue of the Cetaceans of the North Pacific, by Mr. Dall, a glossary of words and phrases used by whalers, and a list of stores and outfits. As an exhaustive treatise, even of a limited field of the whale-fishery, this book will probably occupy the first rank in the literature of the subject.

THE Reports and Proceedings for 1873 of the Miners' Association of Cornwall and Devon contain a number of valuable papers on various subjects connected with mining. The Association, we regret to see, is somewhat cramped for want of funds, though we are glad to see from the lecturer's report that much good work is being done in the way of spreading scientific knowledge among the young men of the districts in the midst of which the Association is established.

THE sum of 22 guineas, subscribed by a few gentlemen, having been placed in the hands of the Council of the Leicester Literary and Philosophical Society to be distributed in prizes, in such a manner as to promote the study of natural science, the Committee appointed for carrying out the scheme have resolved to offer the prizes on a plan by which they hope that the interest and co-operation of a large number of persons will be secured, and the Town Museum at the same time greatly benefited. The prizes will be awarded for specimens of Leicestershire rocks, minerals, and fossils; Leicestershire insects and spiders; Leicestershire shells, land and water; Leicestershire plants, including cryptogams. Every specimen must have been collected within the borders of the county; and the other precautions are such as ought to produce a valuable local collection of specimens.

FEW persons are aware of the important exploration which has been going on for a year or two past in Costa Rica, under the direction of Prof. William M. Gabb, a geologist and explorer of Philadelphia, well known for his excellent scientific work, especially in connection with the geological survey of California, under Prof. Whitney. The special object is an investigation of an entirely unknown region of South-eastern Costa Rica, inhabited only by savages, but known to contain rich treasures of minerals, worked by the Spaniards in the early days of the Conquest; this knowledge being only by traditions. Although the party has consisted only of Prof. Gabb and four assistants, it has already gathered a great deal of important information and material in reference to the economical, scientific, and political history of the region investigated. In the course of his labours, Prof. Gabb found the people less savage than had been supposed, and he has already succeeded in winning their confidence to such an extent as to induce their chief to accompany him on a visit to San José. As might have been expected, the geological structure of the country has occupied a large share of Prof. Gabb's attention, and enough has been dis-

covered to warrant the belief that the mineral resources are of great importance. The greatest interest attaches, however, to the discovery of two previously unknown volcanoes, not less than 7,000 ft. high, in the main cordillera just north-west of Pico Blanco. Of these he is about to make a thorough examination. The natural history collections made by the professor are of unusual magnitude and value, embracing all departments of zoology, and especially rich in mammals, birds, reptiles, and insects. Of fish there were but few species, but all that could be found were secured. The ethnology and philology of the country have been attended to very thoroughly. Material illustrating the manners and customs of the people was also gathered in great quantities, and important discoveries made of *Huacos*, or prehistoric graves. In addition to these, Prof. Gabb is on the track of an ancient buried city, of which no mention is made in any history of the country. The natural history and ethnological collections made have been sent to the National Museum, where they form a conspicuous feature in the Central American series. The material thus collected by Prof. Gabb will, on his return, be made the subject of an elaborate work, in which he hopes to present the whole subject of the physical and natural history of the country in its fullest detail. An important geological discovery made by him is that the appearance of dry land on the isthmus is of Tertiary date, and that it is coeval with the period of volcanic excitement in the Californian sierra.

MR. E. DUNKENFIELD JONES, of Pyroleira, near Jacareby, province of São Paulo, Brazil, writes us that on April 21 he witnessed a most glorious lunar rainbow just after a thunderstorm, at about 8.30 P.M. The arc was one of about 120°, and the secondary bow was just visible though not distinct; but the most remarkable part of the phenomenon was the increase of light over the *whole segment* of the circle. The clouds within the rainbow appeared much lighter than those outside. The bow was quite white, not the slightest trace of colour appearing. The moon was only five days old, and it seems strange that the rainbow should have been so bright with so young a moon. Our correspondent understands that lunar rainbows are very uncommon in that part of the world. This is natural, he states, for *showers* (during which alone the phenomenon can take place) generally occur before sunset and are rare at night.

THE exhibition intended to celebrate the fiftieth year of the Franklin Institute is to be held in Philadelphia from Oct. 6 to Oct. 31. All products of national industry may be sent for exhibition. In addition to three classes of premiums—a silver medal of the Franklin Institute, a bronze medal, and a diploma of honourable mention—cases of special merit may be referred to the Committee on Science and Arts, with a recommendation for the award of the Scott legacy premium or the Elliot Cresson gold medal. The Scott legacy premium—a bronze medal and 20 dols.—is vested in the City of Philadelphia by the provisions of the will of John Scott, of Edinburgh, made in 1816, and the city has confided the trust to the Franklin Institute. The Elliot Cresson gold medal is an honour which has rarely been awarded.

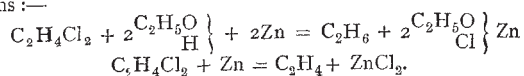
"REPORT on the Physical Character and Resources of Gippsland" (Melbourne, 1874) is the title of a pamphlet of upwards of 60 pp., containing a report of the Surveyor-General and the Secretary of Mines for Victoria of observations made on a recent tour through that part of the colony of Victoria. Gippsland includes that part of the colony between E. long. 145° 50' and 150°, and contains an area of 13,898 square miles. The report contains many careful observations on the geology, natural history, and resources of the district, and is a valuable addition to our knowledge of the great southern continent. A good map and a geological section accompany the report.

LAST week two remarkably fine examples of the Smooth Hound or Skate-toothed Shark (*Mustelus vulgaris*) were taken in the fish weirs at Rhos Tynach, near Llandudno, and have been secured by Mr. W. Saville-Kent for the tanks of the Manchester Aquarium. The fish arrived in good condition, and have proved to be a pair, male and female. The latter, since its arrival, has presented the institution with six young ones; these are all doing well, already take food, and are now swimming about with the parents in the tank allotted them, 40 ft. long, presenting a most interesting spectacle. Some young herring have been introduced by way of experiment, and the result has been so satisfactory that it is sanguinely anticipated that the Manchester Aquarium will shortly possess as fine a shoal of herring as may be seen at Brighton. The inland position of the former station and the consequent difficulties to be overcome in transit will considerably enhance the value of such an exhibition. The attendance at the weekly lectures and the interest manifested in them continue to increase.

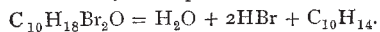
THE additions to the Zoological Society's Gardens during the past week include a Laughing Kingfisher (*Dacelo gigantea*) from Australia, presented by Mr. J. S. White; two Black-handed Spider Monkeys (*Ateles melanochir*) from Central America, presented by Mr. S. W. Rix; a Greater Sulphur-crested Cockatoo (*Cacatua galerita*) from Australia, presented by Miss S. Hooper; a Tamandua Ant-eater (*Tamandua tetradactyla*) from South America, deposited; and three Blotched Genets (*Genetta tigrina*), born in the Gardens.

SCIENTIFIC SERIALS

THE *Journal of the Chemical Society* for July contains the following papers:—Note on a new mineral from New Caledonia, by Archibald Liversidge. This mineral is a hydrated silicate of nickel and magnesium allied to *albite*.—Messrs. Gladstone and Tribe contribute the seventh part of their researches on the action of the copper-zinc couple on organic compounds. The substances now submitted to the action of the couple are the chlorides of ethylene and ethylidene. The dry chlorides are not acted on by the couple, even at a boiling heat, but in presence of water a feeble decomposition occurs. The decomposition is more energetic in the case of ethylidene chloride in the presence of alcohol, decomposition taking place according to the equations:—



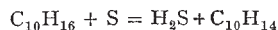
Ethylene chloride only undergoes a small amount of decomposition when mixed with alcohol and heated with the couple.—Isomeric terpenes and their derivatives, Part IV., §1.—On cajuput oil, by Dr. C. R. A. Wright and T. Lambert. The oil was fractionally distilled, and the fraction boiling at 176°–179° (giving on analysis numbers agreeing with the formula $\text{C}_{10}\text{H}_{18}\text{O}$) was used for the experiments described. When treated with bromine the compound $\text{C}_{10}\text{H}_{18}\text{Br}_2\text{O}$ is produced, and this, on distillation, decomposes as follows:—



The cymene thus obtained is identical with that obtainable from many other terpene derivatives, since it yields by oxidation a mixture of terephthalic and acetic acids.—§ 2. On the action of pentasulphide of phosphorus on terpenes and their derivatives, by Dr. C. R. A. Wright. The action of this substance appears to be the same in the case of citronellol and cajuputol, a terpene being first produced according to the reaction:—

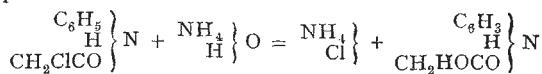


and this terpene by the further action of the pentasulphide splitting up thus:—



The cymene produced is identical with the preceding.—Action of ammonia on phenyl-chloracetamide and cresyl-chloracetamide, by Dr. D. Tommasi. When ammonia is dissolved in a mixture of alcohol and water, and the amides warmed with this

solution, chlorine is exchanged for hydroxyl, according to the equation:—



and similarly with the cresyl compound. This new compound, termed by its discoverer *phenyl-hydroxylacetamide*, is decomposed by boiling water, by potassic, sodic, and baric hydrates, this latter substance yielding aniline and some barium salt not examined. *Cresyl-hydroxylacetamide* is obtained by a similar process, and possesses very similar properties.—On Aqua Regia and the nitroxyl chlorides, by Dr. W. A. Tilden. The dried gases evolved from hot *aqua regia* when passed into concentrated sulphuric acid give rise to the deposition of a crystalline substance of the formula NOHSO_4 , while free chlorine and hydrochloric acid gas escape. The acid nitroxyl sulphate heated with dry sodium chloride yields nitroxyl monochloride (NOCl) as an orange-yellow gas liquefying by a freezing mixture of ice and salt. The author's researches prove that this gas is the only compound of nitrogen, oxygen, and chlorine evolved from *aqua regia*, the reaction being:—



The concluding paper is by Charles E. Groves, On the preparation of ethyl chloride and its homologues. The author passes hydrochloric acid gas into ethylic or methylic alcohol containing fused zinc chloride in solution. The present part contains its usual collection of valuable abstracts.

THE *American Journal of Science and Arts*, July.—Results derived from an examination of the United States weather maps 1872-3, by Elias Loomis; this we shall notice separately.—Prof. C. F. Himes describes a method of preparing photographic dry-plates by daylight, by desensitising and resensitising the silver compounds.—On a molecular change produced by the passage of electrical currents through iron and steel bars, by John Trowbridge. The conclusions are:—(1) The passage of an electric current through an iron or steel bar produces molecular change in it, which is apparent both at the closing and breaking of the circuit. (2) The rapid change of direction of a current through iron or steel bars produces a molecular disturbance which is greater than that imparted by a current sent in one direction alone. (3) Magnetisation of the iron or steel is sufficient to restore it to the normal magnetic state which is imparted by the magnetising helix. (4) The molecular action increases with the strength of the electric current.—The magnetism of soft iron, by David Sears. Mr. Sears follows up the investigations of M. Jamin given in the *Comptes Rendus* for Jan. 12 last. His results are:—(1). With poles of the same name opposed to each other the magnetisation of an iron bar forming the armature of the two poles is greater on a part of the armature beyond the two poles than it is when poles of opposite signs are opposed. (2) On points of the armature between the two poles the magnetisation is greatest when poles of the opposite names are opposed. A north and south pole attract an armature, therefore, with much greater force than two north or two south poles. (3) M. Jamin's conclusions from the experiments upon an iron bar forming a core to the enveloping helices are as follows:—(3°) "If the theory of solenoids is admitted, the action of parallel currents should be to increase the intensity of magnetisation; on the contrary, it is diminished. (4°) When the currents in the magnetising helices run in opposite directions, they should act opposed to each other on the currents circulating around the particles of the iron, and should diminish each other's action; on the contrary, it is increased. (5°) The action of the helices should be annulled at the middle of the bar. It is not." When the bar to be experimented on forms not the core, but the armature of two electro-magnets, the effects obtained are the reverse of those obtained by M. Jamin, and tend to confirm the theory of solenoids.—Mineralogical notes: Tellurium ores of Colorado; Geology of the Gold Hill Mining Region, with a map.—Notes on diffraction gratings, by John M. Blake, with woodcuts. After a long account Mr. Blake mentions that in many points he has been anticipated by Lord Rayleigh in the *Phil. Mag.* for February last. The explanation of the origin of the "bands" differs from Lord Rayleigh's.—On the spectrum of the Zodiacal Light, by A. W. Wright. A Duboscq spectroscope with a single prism was employed, the telescope and collimator of which have a clear aperture of 2.4 centimetres. The magnifying power of the former is nine diameters, Special